What is claimed is

1. An apparatus for analyzing performance of a multi-stage radio frequency amplifier, comprising:

an input power source circuit;

a front-stage matching network receiving power provided by the input power source circuit;

a mid-stage network connected in back of the front-stage matching network and receiving power transferred by the front-stage matching network, wherein a plurality of single-stage amplifiers and a plurality of mid-stage matching networks are in the mid-stage network;

a back-stage matching network connected in back of the mid-stage network; and

an output circuit connected in back of the back-stage matching network.

2. The apparatus for analyzing performance of a multi-stage radio frequency amplifier as in claim 1, wherein the mid-stage network further comprises a plurality of single-stage amplifiers and a plurality of mid-stage matching networks, and every mid-stage matching network is clipped between two single-stage amplifiers.

3. The apparatus for analyzing performance of a multi-stage radio frequency amplifier as in claim 1, wherein the input power source circuit comprises a power generating device and an input characteristic impedance.

4. The apparatus for analyzing performance of a multi-stage radio frequency amplifier as in claim 1, wherein the output circuit is an output characteristic impedance with 50 ohms.

5. The apparatus for analyzing performance of a multi-stage radio frequency amplifier as in claim 2, wherein a power source reflection coefficient Γ_S of front stage matching network and a load reflection coefficient Γ_L of the back stage matching network are obtained respectively, the power source terminal reflection coefficient Γ_S is adjusted to be maximum power source terminal reflection coefficient $\Gamma_{S,max}$ for conjugate matching with an input reflection coefficient Γ_{IN} of the mid-stage network, and the load reflection coefficient Γ_L is also adjusted to be maximum load reflection coefficient $\Gamma_{L,max}$ for conjugate matching with an output reflection coefficient Γ_{OUT} of mid-stage network.

6. The apparatus for analyzing performance of a multi-stage radio frequency amplifier as in claim 5, wherein after the maximum gain of the input-stage matching network and of output-stage matching network are acquired, the above two matching network are neglected, and the mid-stage network is treated as a first-stage amplifier, a first-stage mid matching network and a second-stage amplifier.

7. The apparatus for analyzing performance of a multi-stage radio frequency amplifier as in claim 6, wherein gain values of the first-stage amplifier and of the second-stage amplifier are fixed.

8. The apparatus for analyzing performance of a multi-stage radio frequency amplifier as in claim 6, wherein a mid matching network gain G_L and power source terminal mid-matching network G_S are obtained by using the load reflection coefficient Γ_L and the power source terminal reflection coefficient Γ_S, and a power source matching network maximum gain G_{SMAX} and a load

matching network maximum gain G_{LMAX} can be made by adjusting the power source terminal reflection coefficients Γ_S and the load reflection coefficient Γ_L, respectively.

9. The apparatus for analyzing performance of a multi-stage radio frequency amplifier as in claim 7, wherein the first-stage amplifier with fixed gain value and the second-stage amplifier with fixed gain value are neglected, and the mid-matching network is viewed as a first-stage amplifier, a first-stage mid matching network and a second-stage amplifier.

10. The apparatus for analyzing performance of a multi-stage radio frequency amplifier as in claim 9, wherein the power source terminal reflection coefficients $\Gamma_{S'}$ and the load reflection coefficient $\Gamma_{L'}$ are measured from an end of the first mid-matching network and an end of the second mid-matching network, respectively.

11. A method for analyzing performance of a multi-stage radio frequency amplifier, wherein the application comprises improving a prior art trial and error method, the method providing:

identifying whether an unset external network is either a matching network or an amplifier network;

simplifying the multi-stage radio frequency amplifier, wherein the multi-stage radio frequency amplifier is decomposed into a front-stage matching network, a mid-stage network and a back-stage matching network when an external network of the multi-stage radio frequency amplifier is a matching network, and the multi-stage radio frequency amplifier is decomposed into a front-stage amplifier, a mid-stage matching network and a

back-stage amplifier;

adjusting a power source terminal reflection coefficient Γ_S to be a maximum power source terminal reflection coefficient $\Gamma_{S,max}$ for conjugate matching with an input reflection coefficient Γ_{IN};

adjusting a load reflection coefficient Γ_L to be a maximum load reflection coefficient $\Gamma_{L,max}$ for conjugate matching with an output reflection coefficient Γ_{OUT}; and

repeating said above-mentioned steps on non-analyzing networks until all of networks are set.

12. The method for analyzing performance of a multi-stage radio frequency amplifier as in claim 11, wherein the method analyzes the simplified power source terminal reflection coefficient Γ_S of the front-stage matching network of the multi-stage radio frequency amplifier and the simplified back-stage matching network load reflection coefficient Γ_S.

13. The method for analyzing performance of a multi-stage radio frequency amplifier as in claim 11, wherein the method further provides:

obtaining an input terminal reflection coefficient Γ_S of a mid-stage matching network and a load reflection coefficient Γ_L;

obtaining a power source matching network gain G_S and a load matching network gain G_L;

modulating the power source matching network gain G_S to be a power source matching network maximum gain G_{Smax} and the load matching network gain G_L to be a load matching network maximum gain G_{Lmax} by adjusting the reflection coefficient Γ_S and the reflection coefficient Γ_L, respectively; and

deriving maximum transferring rate and less gain loss.

14. The method for analyzing performance of a multi-stage radio frequency amplifier as in claim 11, wherein the method further provides:

identifying the accomplishment of analyzing the multi-stage radio frequency amplifier for a jump procedure;

re-executing the above-mentioned procedures when analysis of the multi-stage radio frequency amplifier is not performed; and

performing the jump procedure when analysis of the multi-stage radio frequency amplifier is complete.

15. The method for analyzing performance of a multi-stage radio frequency amplifier as in claim 12, wherein the method further provides:

measuring first-stage amplifier gain G_{01}, second-stage amplifier gain G_{02}, third-stage amplifier gain G_{03}...., Nth-stage amplifier gain G_N as well as the input reflection coefficient Γ_{IN} and output reflection coefficient Γ_{out} by using a 50 ohms impedance; and

obtaining the power source terminal reflection coefficient Γ_S and the load reflection coefficient Γ_L of each mid-stage matching network.